

Multi-Purpose Anthropomorphic Robotic Hand Design for Extra-Vehicular Activity Manipulation Tasks Using Embedded Fiber Optic Sensors, Phase I

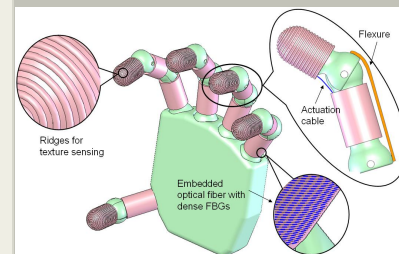
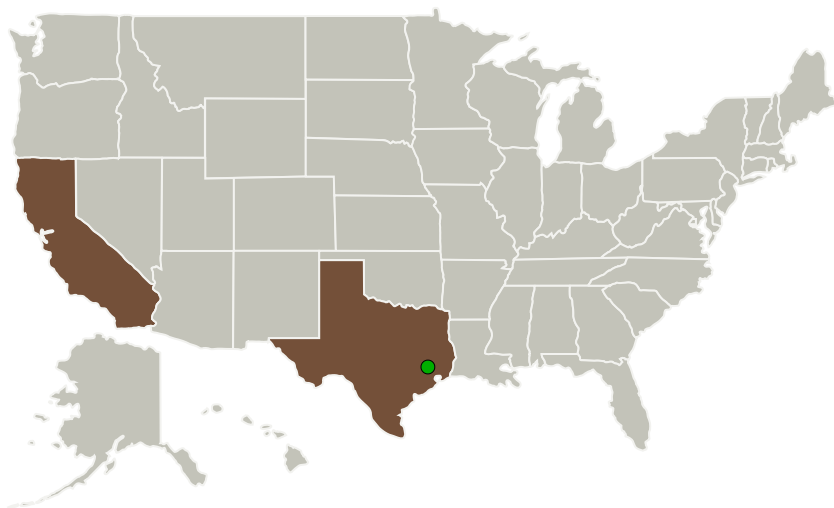
Completed Technology Project (2014 - 2014)



Project Introduction

IFOS proposes to design and build fiber-optically sensorized robotic fingers that can sense force and, objects using only tactile feedback, similar to the skin on a human hand. The innovation, employing fiber optic sensors, will b integrate the highest-density EMI-immune optical sensing for robotic hand systems to enable human-like tactile sensing capabilities. The innovative high-density manipulative system will add great dexterity to robotic hands and will be fully adaptable to performing complex Extravehicular tasks. In Phase I, IFOS will design a robotic hand and fingers system, focusing on the skin and muscle hardware requirements for tactile and force feedback information to be relayed to a central processor, which will then identify objects based on tactile feedback and provide a full haptic sense. A proof-of concept experiments planned for Phase I will demonstrate gripping and grasping using a sub-scale sensorized set of fingers. Results will be used as input for prototype planned for Phase II, along with preliminary test and evaluation recommendations for potential insertion into an advanced Robonaut servicer.

Primary U.S. Work Locations and Key Partners



Multi-Purpose Anthropomorphic Robotic Hand Design for Extra-Vehicular Activity Manipulation Tasks using Embedded Fiber Optic Sensors Project Image

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Organizations Performing Work	Role	Type	Location
Intelligent Fiber Optic Systems Corporation	Lead Organization	Industry	Santa Clara, California
● Johnson Space Center(JSC)	Supporting Organization	NASA Center	Houston, Texas

Primary U.S. Work Locations	
California	Texas

Project Transitions

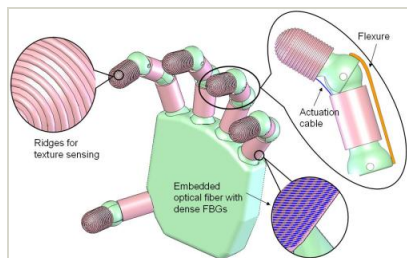
▶ **June 2014:** Project Start

✓ **December 2014:** Closed out

Closeout Documentation:

- Final Summary Chart(<https://techport.nasa.gov/file/137437>)

Images



Project Image

Multi-Purpose Anthropomorphic Robotic Hand Design for Extra-Vehicular Activity Manipulation Tasks using Embedded Fiber Optic Sensors Project Image
(<https://techport.nasa.gov/image/131765>)

Organizational Responsibility

Responsible Mission Directorate:

Space Technology Mission Directorate (STMD)

Lead Organization:

Intelligent Fiber Optic Systems Corporation

Responsible Program:

Small Business Innovation Research/Small Business Tech Transfer

Project Management

Program Director:

Jason L Kessler

Program Manager:

Carlos Torrez

Principal Investigator:

Richard J Black

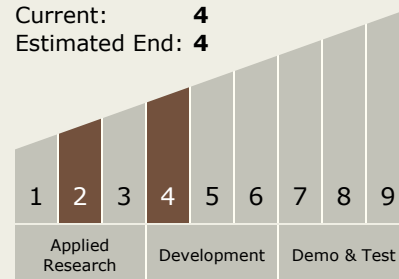
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Technology Maturity (TRL)

Start: 2
Current: 4
Estimated End: 4



Technology Areas

Primary:

- TX04 Robotic Systems
 - TX04.3 Manipulation
 - TX04.3.1 Dexterous Manipulation

Target Destinations

The Sun, Earth, The Moon, Mars, Others Inside the Solar System, Outside the Solar System